

MICROSCOPY FOR THE AMATEUR

by

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cal Supply House, Inc., Chicago.

Typical specimens of *Amoeba proteus* photographed from a prepared slide. Note nuclei, food vacuoles and, in the middle individual, a contractile vacuole.

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Microscopy for the Amateur

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The innumerable interesting objects that may be observed under a microscope have caused a large number of people to choose microscopy as their favorite pastime. The only prerequisite for this fascinating scientific hobby is an open mind, an eagerness to discover new truth and thus help lift the veil which still covers a multitude of mysteries. Leeuwenhoek, Pasteur, and Koch were only amateurs with the microscope but their pioneering work has brought great benefit to mankind.

A microscope does not necessarily need to be very expensive. In selecting an instrument, however, one should give preference to a stand to which lenses can later be added as one's pocket-book permits and as the need is felt. Through the microscope an entirely new world is unfolded—new because nothing like it may be observed with the naked eye ; each little piece dovetails into another, like a jigsaw puzzle, to form a complete picture of the world as we see it, sense it, and understand it, in spite of the fact that ten new questions may be raised to each answer found.

Observation through the microscope of primitive life in an alga ; of a complete life cycle in an ameba ; of the minute world of microscopic life in a drop of water ; of a crystal of salt ; or a mere hair on a fly's leg—each is an unforgettable experience making one feel the superiority of modern man in being able to produce such remarkable tools, and giving him the urge to seek deeper and deeper into the many riddles before him.

Let us make a short excursion into a drop of water and observe what is taking place. We shall not use mere tap or lake water, but on an afternoon stroll into the woods and fields we shall seek out a good-sized ditch with stagnant water, or an old swimming hole with yellow or greenish scum. It may look disgusting at first, but it is the kind which is teeming with life, the kind that makes the microscopist sit up nights and forget trivialities which have annoyed him during the day. We fill a small bottle with scum and another bottle with some of the bottom ooze and head for home. Arriving at our peaceful sanctuary we place a drop of our find on a glass slide, put a cover glass over it, and when the drop has spread out in an even layer between the two pieces of glass, it is ready for examination under the microscope. We place the slide on the stage and arrange the light so that a beam is thrown up from the mirror below, through the slide and into the objective. Next the objective is focused on the drop of water and here we are!

Well, what do we see ? We may see black spots of dirt from our lenses, we may see air-bubbles which look fascinating at first, but soon become uninteresting, or we may see nothing at all if we have the wrong kind of material or if we have been over-generous and put too much of it on the slide. However, if we have selected our material carefully and prepared the slide well, we shall be gazing into a completely new world.



Courtesy, General Biological Supply House, Inc. Chicago.

Two vegetative cells of the alga *Spirogyra*, showing the spiral chromatophores.

Among the algae may be the beautiful green *Spirogyra*, divided into cells having spiral bands of green chlorophyll ; or the light may strike the pearly beads of *Anabaena*, and in between may be the light hairs of *Oedogonium*, the spores of which move about freely. In and out of this

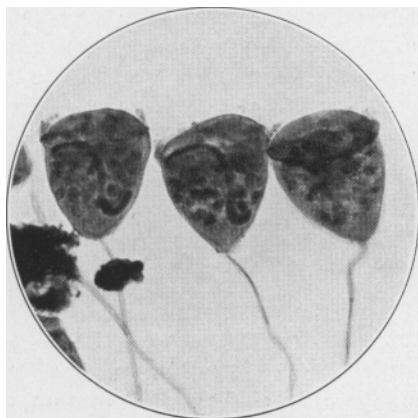


Courtesy, General Biological Supply House, Inc., Chicago.

A common diatom ("glass boat"), *Pinnularia nobilis*.

fairyland-forest is life teeming with the queerest creatures imaginable. Our attention is drawn to a slowly moving "glass-boat" just coming into view—it is a member of the diatom family which includes a great variety of beautiful forms. Suddenly we are surprised by the arrival of a slipper-shaped "beast," a paramecium, whose body is covered with fine "hairs" called cilia, which by continuous motion serve to propel their owner. We note an opening at one side into which is passing a steady stream of water ; this is the mouth, and the food entering it consists mainly of bacteria of which stagnant water is always full. This one-celled microscopical "guinea pig" is a busy fellow who has no time to linger and is soon out of sight. As we look around we note something which looks like a small cluster of flowers ; it is the bell-animal *Vorticella*. The stem is rather strange in that when stimulated it will

suddenly contract like a corkscrew and then slowly straighten itself out again. We have here the first semblance of muscle action as in



Courtesy, General Biological Supply House, Inc., Chicago.

The "bell animal," *Vorticella*. The beating of cilia at the rim of the bell carries food into the cell.

higher animals. The bell itself is the "business end" of this creature, and around its rim are cilia which are constantly churning the water, carrying smaller organisms into the bell in order to satisfy a voracious appetite.

A small water-flea crosses the field—it goes so fast that we do not have time to verify that it is a half-cousin to the lobster ! But say, a long green submarine is now coming into view ; at its front end it has a long one-haired beard with which it propels itself, and a red "eyespot" with a lean and hungry look ; it is *Euglena*, the organism which the zoologists claim is a plant and the botanists say is an animal. Here is really an orphan of the storm for which some microscopist could do much in the way of adoption. Part of its food is manufactured from the sunlight which forms starch from water and carbon dioxide when it strikes green chlorophyll ; the balance of its diet, again bacteria, is hunted up in the fairyland wilderness. After watching the trumpet-shaped *Stentor* and a few of the many wheel-animals (rotifers) we may find that our eyes need a rest, and in order not to overdo a good thing we call it a clay, put away the scope, and begin to plan the next excursion.

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